

CLAIMS

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1. A method for heat treating a barium titanate-based particulate composition comprising:
heating a barium titanate-based particulate composition at a temperature between about
5 700 °C and about 1150 °C to form a heat-treated particulate composition.

2. The method of claim 1, comprising heating the barium titanate-based particulate composition at a temperature between about 900 °C and about 1100 °C.

10 3. The method of claim 1, wherein the barium titanate-based particulate composition is formed by a hydrothermal process.

4. The method of claim 1, wherein the barium titanate-based particulate composition has an average particle size of less than about 0.25 micron prior to heating.

15 5. The method of claim 1, wherein the heat-treated composition has an average particle size of at least 25% greater than the average particle size of the barium titanate-based particulate composition.

20 6. The method of claim 5, wherein the heat-treated composition has an average particle size of at least 100% greater than the average particle size of the barium titanate-based particulate composition.

25 7. The method of claim 6, wherein the heat-treated composition has an average particle size of at least 200% greater than the average particle size of the barium titanate-based particulate composition.

8. The method of claim 1, wherein the heat-treated composition has an average particle size of between about 0.2 micron and about 1.0 micron.

9. The method of claim 1, wherein the heat-treated particulate composition has essentially the same composition as the barium titanate-based composition.

10. The method of claim 1, wherein the barium titanate-based particle composition
5 comprises substantially spherical particles before the heating step.

11. The method of claim 1, wherein the heat-treated composition comprises substantially spherical particles after the heating step.

10 12. The method of claim 1, wherein the barium titanate-based particulate composition is heated for a time period of at least one hour.

13. The method of claim 1, further comprising depositing at least one dopant coating layer on surfaces of particles of the barium titanate-based composition.

14. The method of claim 13, further comprising adjusting the A/B ratio of the heat-treated composition.

15. The method of claim 14, comprising adjusting the A/B ratio of the heat-treated
20 composition by depositing a coating comprising a barium compound on surfaces of particles of the heat-treated composition.

16. The method of claim 1, further comprising sintering the heat-treated composition.

25 17. The method of claim 16, comprising sintering the heat-treated composition at a temperature between about 1150 °C and about 1400 °C.

18. The method of claim 1, further comprising forming a dielectric layer from the heat-treated composition.

sb A4 19 A method for heat treating a barium titanate-based particulate composition comprising: heating a barium titanate-based particulate composition at a temperature and for a time sufficient to cause particle growth and insufficient to cause particle sintering thereby forming a heat-treated particulate composition.

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20. The method of claim 19, comprising heating the barium titanate-based particulate composition at a temperature and for a time sufficient to cause particle growth to a selected average particle size.

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21. The method of claim 20, comprising heating the barium titanate-based particulate composition at a temperature and for a time sufficient to cause the average particle size of the barium titanate-based particulate composition to increase by at least 25%.

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22. The method of claim 20, comprising heating the barium titanate-based particulate composition at a temperature and for a time sufficient to cause the average particle size of the barium titanate-based particulate composition to increase by at least 100%.

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23. The method of claim 19, wherein the barium titanate-based particulate composition is formed in a hydrothermal process.

24. The method of claim 19, further comprising depositing at least one dopant coating layer on surfaces of particles of the heat-treated composition.

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25. The method of claim 19, further comprising adjusting the A/B ratio of the heat-treated composition.

26. The method of claim 25, comprising adjusting the A/B ratio of the barium titanate-based composition by depositing a coating comprising a barium compound on surfaces of particles of the heat-treated composition.

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27. The method of claim 19, further comprising sintering the heat-treated composition.

28. The method of claim 27, comprising sintering the heat-treated composition at a temperature between about 1150 °C and about 1400 °C.

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29. The method of claim 19, further comprising forming a dielectric layer from the heat-treated composition.

30. The method of claim 19, wherein the heat-treated particulate composition has essentially the same composition as the barium titanate-based composition.

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